

New York Energy Forum 2020

WE DELIVER MORE. ENERGY.

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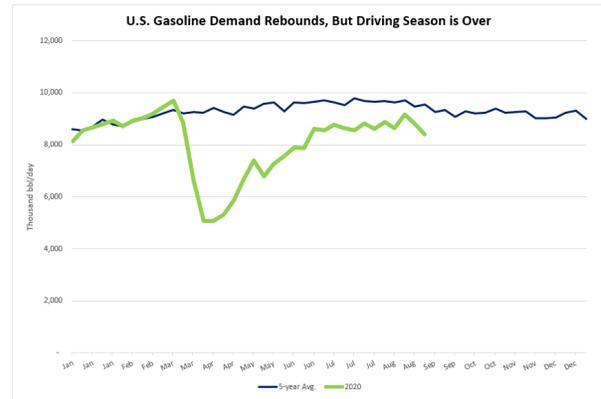
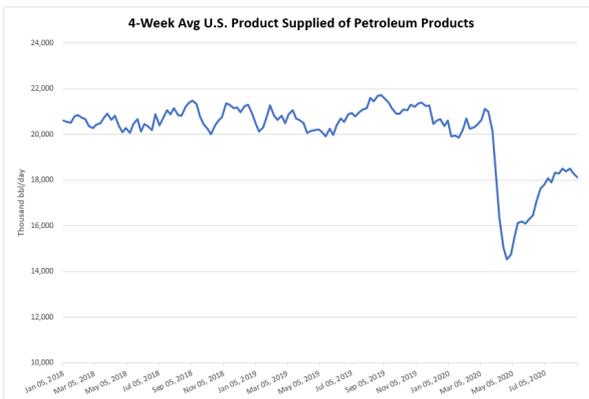
 CME Group



Agenda

- Covid Demand Impact
- 2020 US Crude Dynamics
- US Gulf Coast Development
- Global Natural Gas
- LNG Development

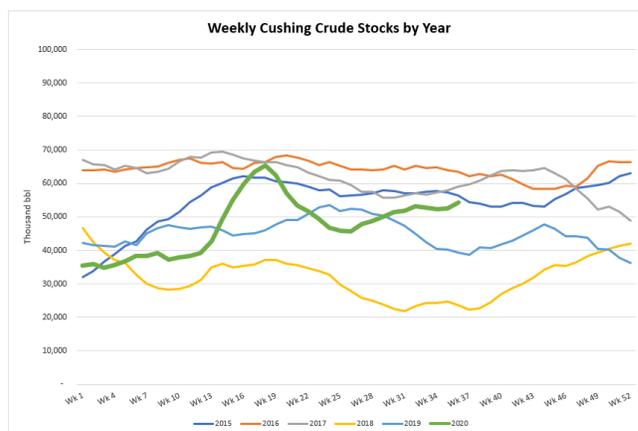
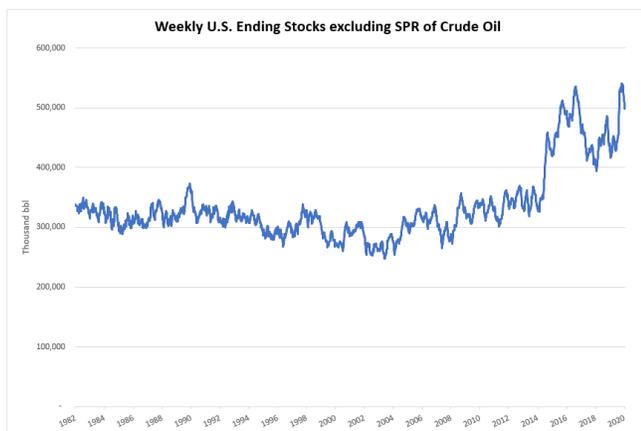
COVID-19 Fallout: Gasoline/Jet Fuel Demand



- As people adhered to local lockdown measures, international demand for refined products plummeted— mid April 2020 saw the lowest demand for refined products (~**14mmbbl/day**) since the EIA started tracking this data.
- In the U.S. transportation fuel demand at the end of April 2020 was down significantly vs. early January 2020:
 - Refined Products: **-30%**
 - Gasoline: **-40%**
 - Jet Fuel: **-63%**
 - Diesel: **-13%**
- NYMEX RBOB Gasoline prices hit their lowest ever on March 23, 2020 at **\$0.412/gal**

Source(s): EIA

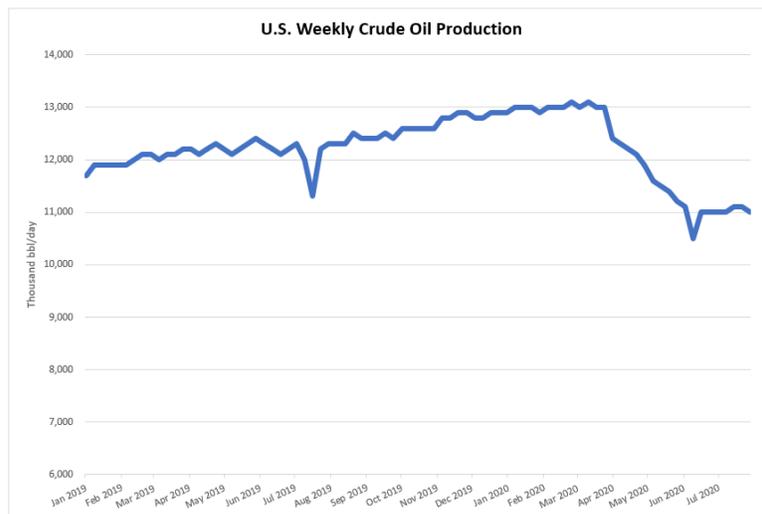
COVID-19 Fallout: Crude Oil Storage



- With less crude being processed by refiners, storage tanks were absorbing excess barrels
- A **record ~19mmbbl** of crude was added to storage for the week ending April 10, 2020
- Int'l floating crude storage (on ships at sea) increased by **218%** from the beginning of 2020 to the end of April

Source(s): EIA

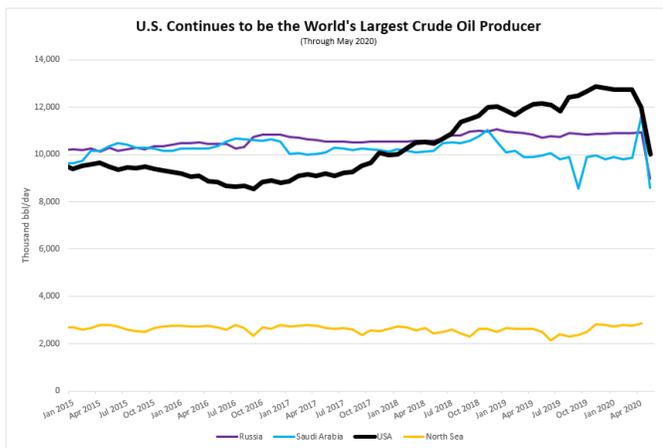
COVID-19 Fallout: Crude Production



- Though averaging **12.3mmbbl/day** in 2019 and **13.0mmbbl/day** in Q1 2020, U.S. crude production has been under **11.0mmbbl/day** since August 2020
- The number of operating oil & gas rigs are at the lowest level recorded– currently at **254**

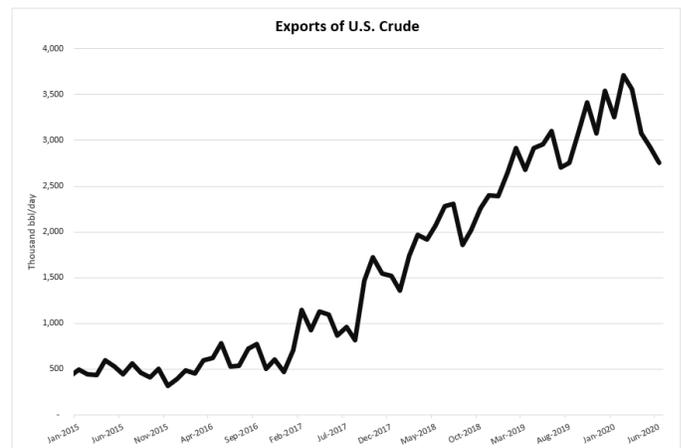
Source(s): EIA

2020 U.S. Crude Dynamics



Crude Production

- U.S. Crude production hit a record high **13.1mmbbl/day** in March
- Production down **~22%** since peaking ,U.S. still world's largest crude producer

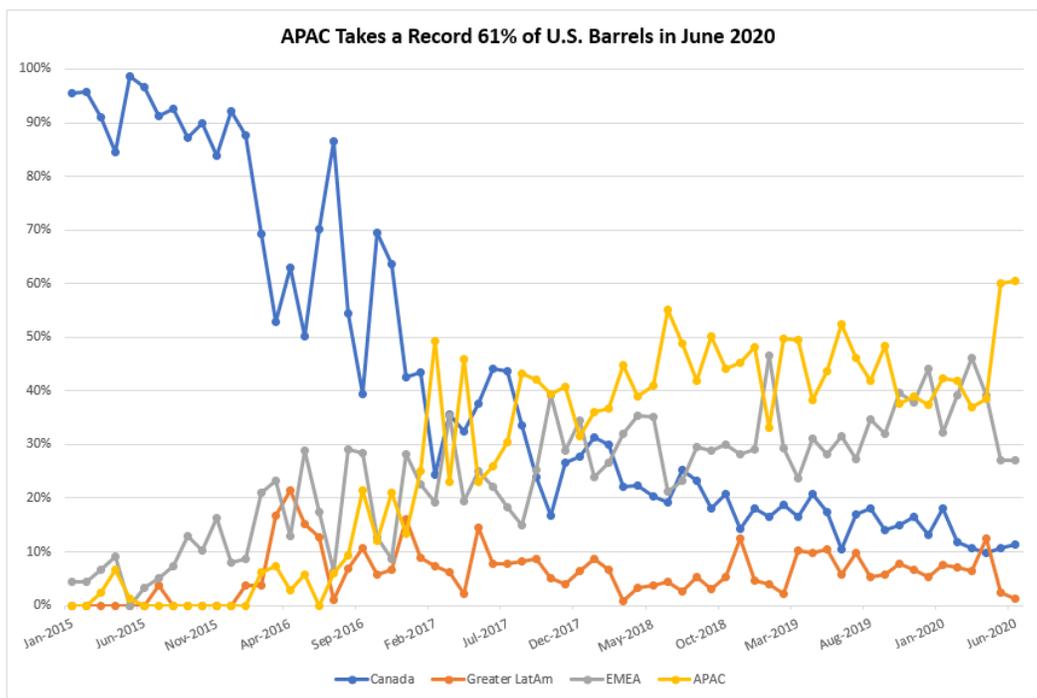


Crude Exports

- A record **3.7mmbbl/day** of U.S. crude was exported in Feb 2020
- Though exports fell 26% Feb-Jun 2020, YTD exports are still **up 12%** YoY driven in part by increased appetite from China.

Source(s): EIA, Bloomberg

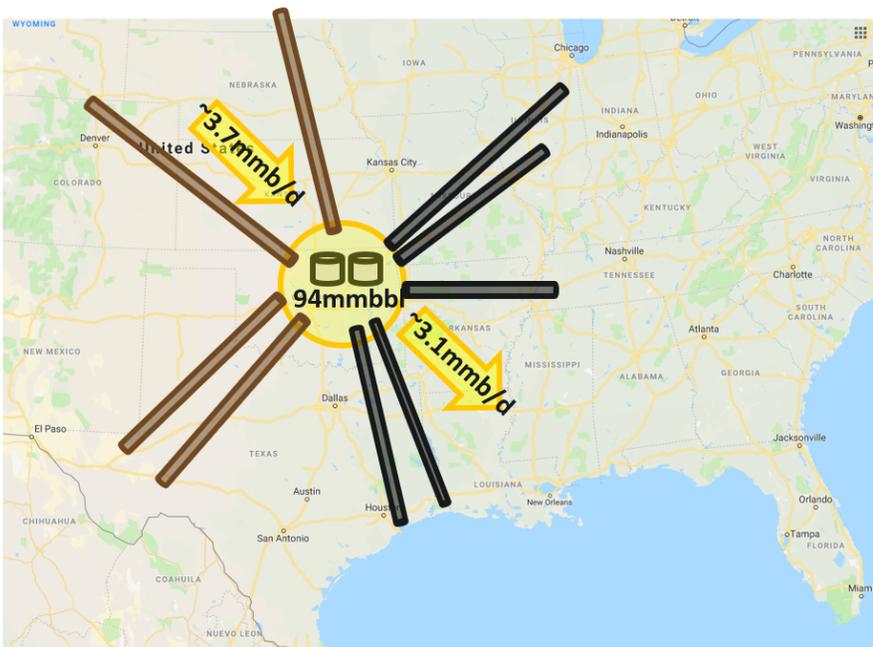
U.S. Crude Destinations in 2020



- APAC countries have taken **~47%** of U.S. crude exports in 2020 YTD
- U.S. exports to EMEA have been **35%** of total in 2020 YTD

Source(s): EIA

U.S. Crude Oil Infrastructure



Inbound pipes (16) carrying Western Canadian, Bakken, Rockies, Permian, and Oklahoma crude



Outbound pipes (14) to Gulf Coast refineries (50%) and inland refineries (50%)

Cushing, OK

The “Pipeline Crossroads of the World”

- Covering **5,000** acres
- **94mmbbl** of crude storage (est. ~104mmbbl by end 2020)
- ~**350** storage tanks, most with floating roofs
- **3.7mmb/d** in **16** inbound pipes (est. ~4.9mmb/d by end 2020)
- **3.1mmb/d** in **14** outbound pipes (est. ~5.4mmb/d by end 2020)

Source(s): Google Maps, RBN Energy

Permian to Houston Infrastructure Relieves Bottlenecks



The introduction of 3 new pipelines able to move **~2.2mmbbl/day** of West Texas crude to the Gulf Coast for export helped relieve bottlenecks that saw this basis spread at over \$20/bbl in late 2018.

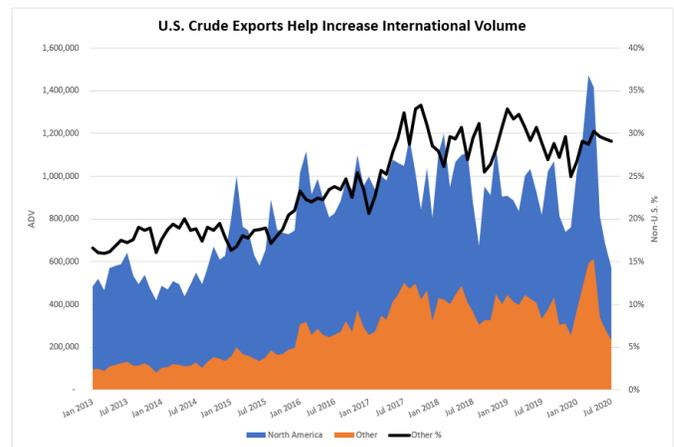
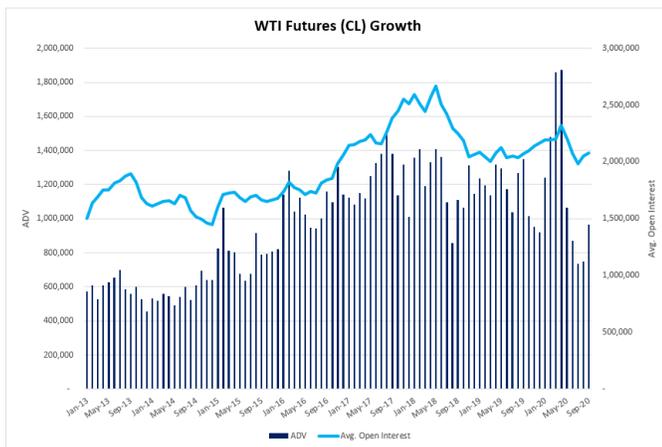
Aug 2019:
Plains' Cactus II (**670k bbl/day**)

Aug 2019:
EPIC Midstream' NGL (400k bbl/day until **600k bbl/day** in Feb 2020)

Apr 2020:
P66/Enbridge's Gray Oak (**900k bbl/day**)

Source(s): Google Maps, RBN Energy, CME Group

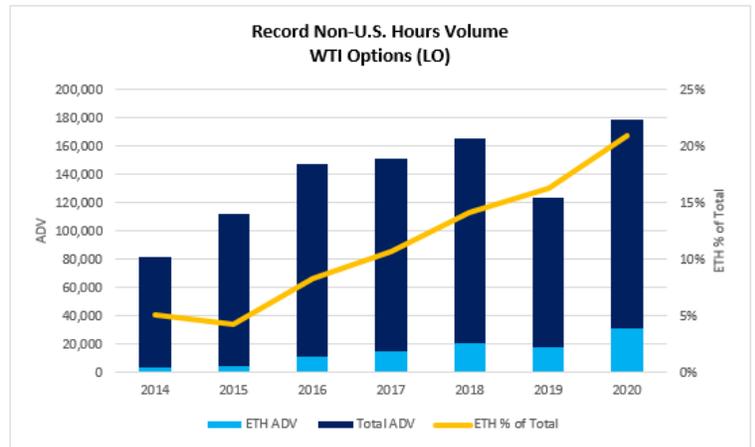
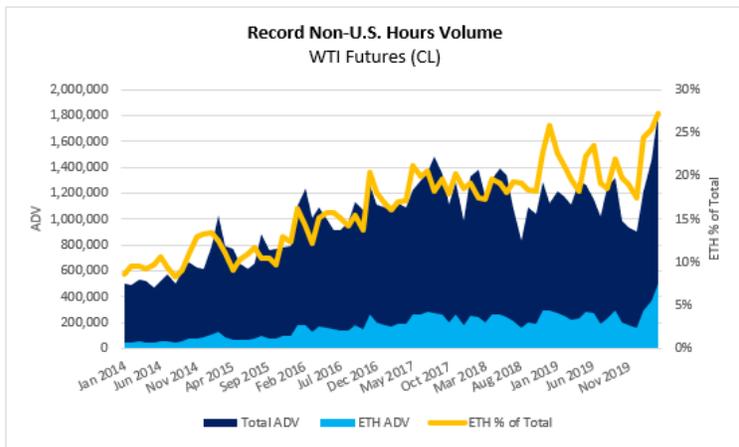
NYMEX WTI Benchmark Growth



- WTI ADV is **~1.23mm/day** YTD, up **2%** from last year
- **29%** of WTI Futures and Options volume international 2020 YTD, up from **18%** in 2015

Source(s): CME Group

NYMEX WTI Benchmark Growth

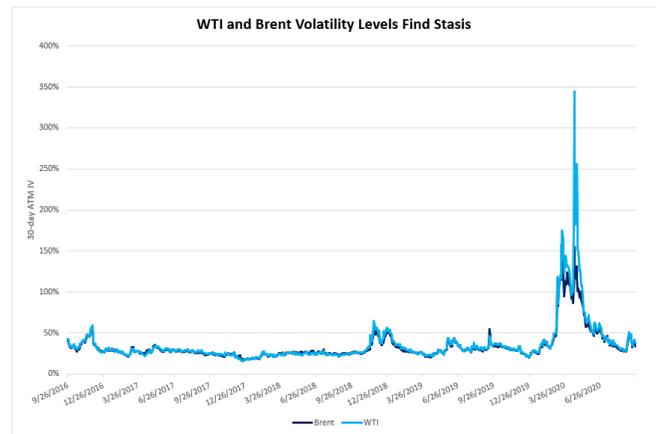
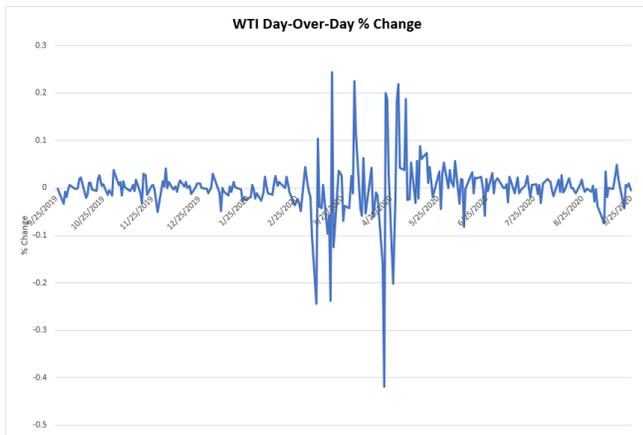


WTI futures Asia/EMEA Hours % of Volume:
 2020 YTD: **24%**
 2015: **11%**

LO Asia/EMEA Hours % of Volume:
 2020 YTD: **20%**
 2015: **4%**

Source(s): CME Group

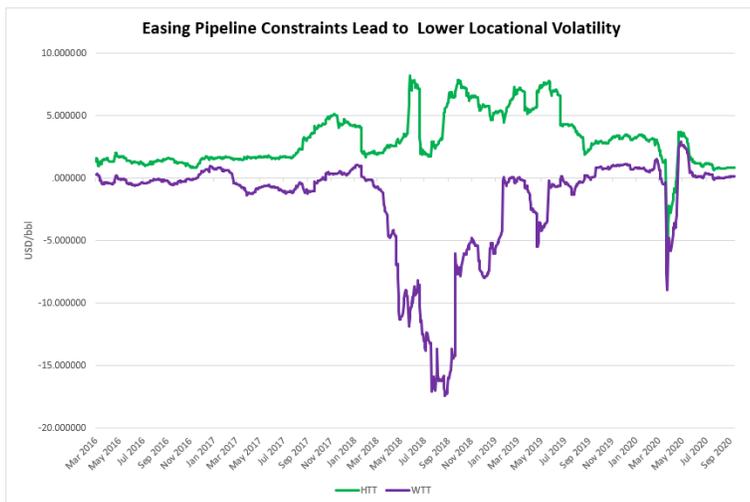
Crude Markets' Return to Stability



- After WTI and Brent hit historically high volatility levels earlier this year, both have returned down **below 40%** in September 2020

Source(s): CME Group, Quikstrike

NYMEX WTI and Crude Differentials



HTT
WTI Houston (Argus) vs. WTI Trade Month
Futures
Open Interest at **167k**

WTT
WTI Midland (Argus) vs. WTI Trade Month
Futures
Open Interest at **172k**

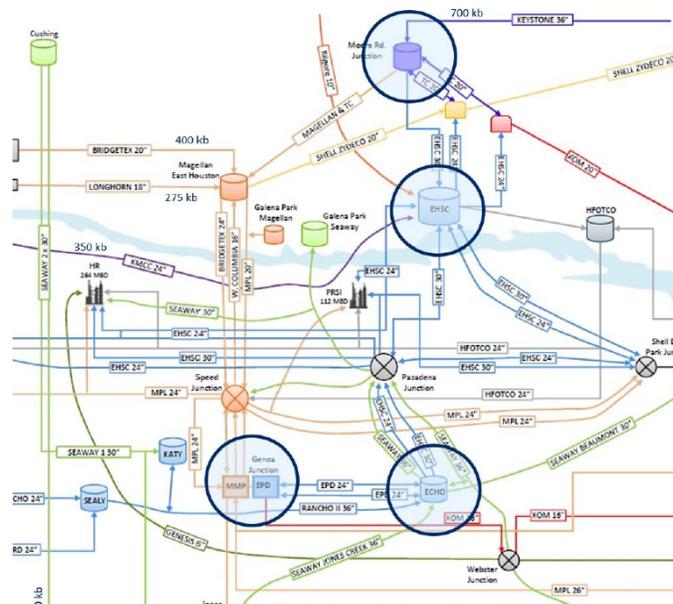
- Though nearly full about a year ago, pipelines moving crude from the Permian to the Gulf Coast have excess capacity now, putting a damper on volatile basis spreads:
 - o ~2.2mmbbl/day takeaway added in 2020
 - o Crude production cuts accelerated balancing

Source(s): CME Group, RBN Energy

NYMEX WTI Houston Futures (HCL)

- CME Group’s physically delivered WTI Houston contract launched in November 2018, reflecting the price of a barrel in the USGC
- Delivers into the Enterprise system – ECHO, Enterprise Houston Ship Channel (EHSC), Genoa Junction, and Moore Road
- Gain access to the most robust crude infrastructure in Houston, with connections to major refiners, robust storage capacity and export terminals
- Specifications are reflective of Midland crude, and provide a consistent, quality barrel of crude oil. Updated specs below starting with March 2020 contract:

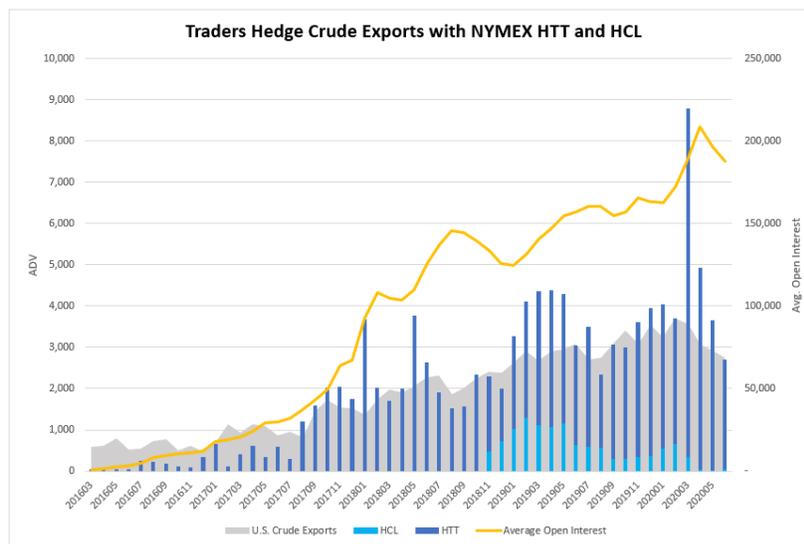
- 40-44 API gravity
- .200 Sulfur
- 3 ppm Nickel & Vanadium



Coming soon: NYMEX Dock Allocation Run Process
 Allows firms to load a full cargo of light sweet crude purchased under a WTI Houston (HCL) contract onto a cargo ship at the Enterprise terminal (*pending regulatory review*)

Source(s): CME Group, Enterprise

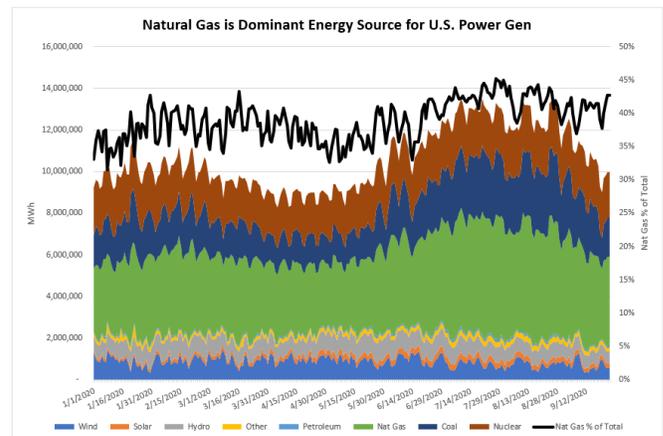
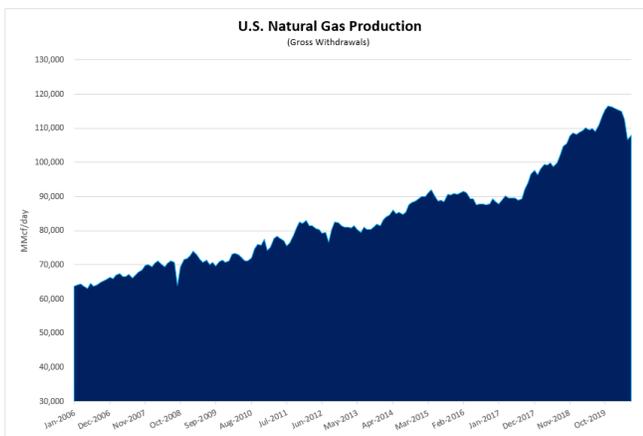
NYMEX Gulf Coast Crude Products



- **HCL** (WTI Houston Futures)
 - o Physically delivered at 4 different Enterprise terminals in the USGC
- **HTT** (WTI Houston (Argus) vs. WTI Trade Month Futures)
 - o Financially settled; reflects the differential between WTI at Houston and WTI at Cushing
- Though U.S. crude exports have slowed, open interest in HCL and HTT combined has averaged **~186k** in H1 2020

Source(s): CME Group, EIA

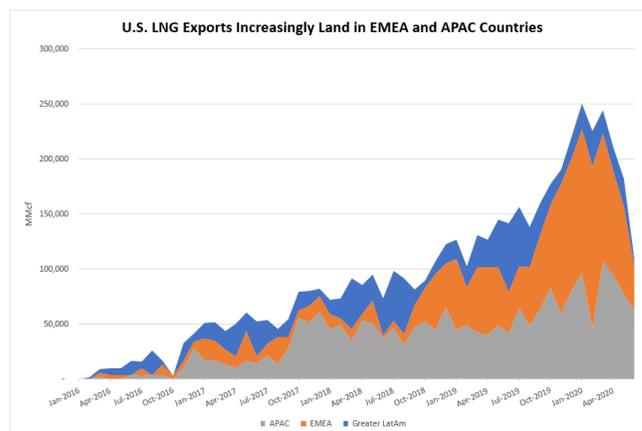
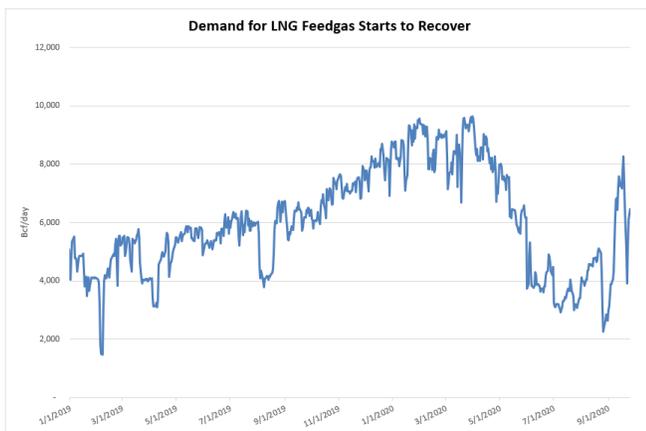
Increasing U.S. Natural Gas Production & Consumption



- Despite the pandemic, the U.S. is producing **3% more** of natural gas YoY at ~112,200 MMcf/day
- **47.2 Bcf** of natural gas was consumed by electric power plants on July 27, 2020, an all-time record
- ~**39%** of U.S. electricity generation comes from natural gas YTD

Source(s): EIA

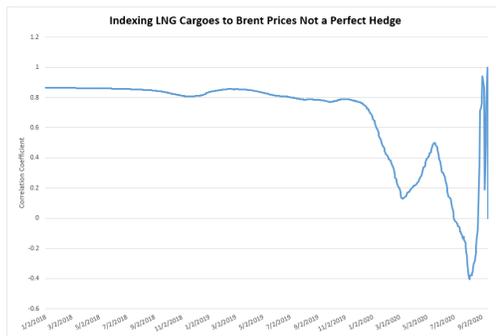
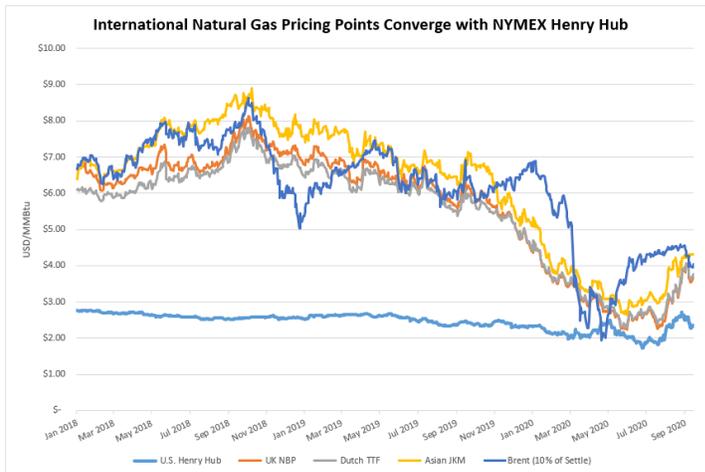
U.S. LNG Exports Out of the Gulf Coast



- U.S. LNG Export terminals are now taking in ~5,800 Bcf/day of feedgas in September after a flurry of cancelled cargoes this summer saw this number almost halved
- Though waterborne LNG exports are down 23% in June YoY, they're up 58% YTD YoY, averaging 203,600MMcf/month
- Six countries have taken over half of U.S. LNG Exports YTD:
 - **APAC:** South Korea (13%), Japan (11%)
 - **EMEA:** Spain (11%), Turkey (7%), UK (7%), and France (6)

Source(s): EIA, Platts

Natural Gas 2020: Global Convergence



COVID Demand Destruction

- Lockdowns have restricted travel and substantially reduced energy consumption.

Low Oil Prices

- Oil-indexed gas prices in Europe and Asia have declined. Reduction in US Shale production over the last few months has reduced gas production as well leading to an increase in Henry Hub prices

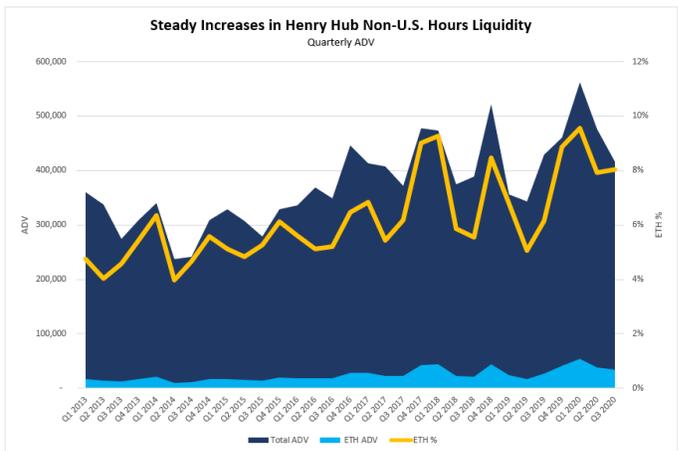
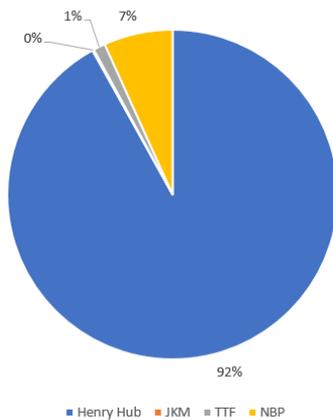
Supply Glut

- LNG supply has increased by more than 40% in the last 5 years. European gas prices fell as storage reached record highs while demand hasn't caught up at the same pace.

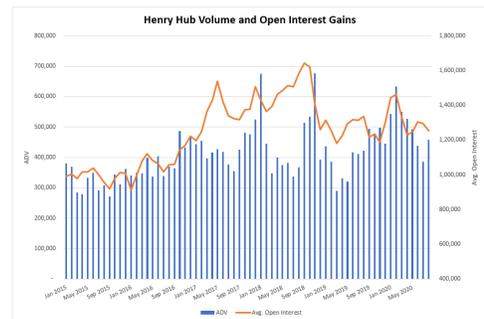
Source(s): Bloomberg, CME Group

NYMEX Henry Hub: Global Reach

Global Gas Derivatives Market Relies on Henry Hub
(Total normalized volumes since 2015)



- Henry Hub Futures YTD ADV of **498k** is up **28% YoY**
- Non-U.S. hours trading in NG has grown to **~9% of total volume**, up from just 3% in 2011
- Since 2015, **92%** of Exchange cleared natural gas trades are priced off of NYMEX Henry Hub



Source(s): CME Group

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